

Exhibit "B"

Part 3 of 10

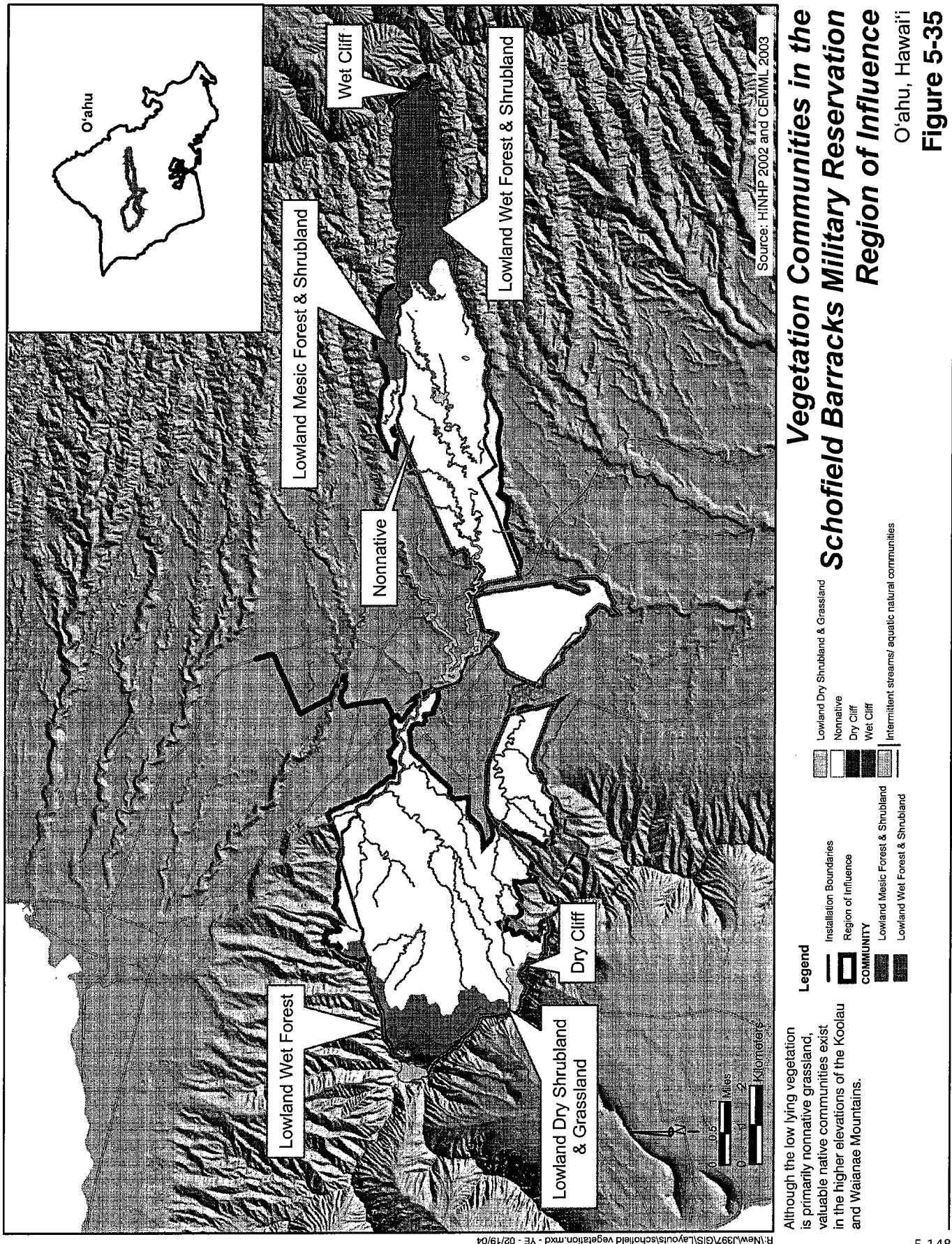


Exhibit "B"
Part 3 of 10

5.10 Biological Resources

Montane wet ‘ōhi‘a forest is generally restricted to gulches and ridge tops between 3,200 and 4,000 feet (1,219 meters). The dominant tree is ‘ōhi‘a. Additional native species include manono (*Hedyotis terminalis*), mehame (*Antidesma platyphyllum*), ‘ōhi‘a hā (*Syzygium sandwicensis*) and kāwa‘u (*Llex anomala*). *Cibotium* species are the dominant ferns. Herbaceous plants are māmaki (*Pipturus albidius*), naupaka kuahiwi (*Scaevola* spp.), and na‘ena‘e (*Dubautia* spp.). Rare plants *Alsinidendron trinerve* and *Melicope christophersonii* complete the community.

‘Ōhi‘a shrubland falls between 2,500 and 3,000 feet (762 to 914 meters) in SBMR. The steep windswept ridges have shallow soil, and rainfall is generally between 100 and 200 inches (254 and 508 centimeters) per year. Dwarfed native tree and shrub species thrive here. In addition to ‘ōhi‘a, this community frequently consists of manono, ‘alani (*Melicope* spp.), and kōlea (*Myrsine* spp.). Common herbaceous species in this community include *Trematolobelia* spp. and *Clermontia* spp., and ferns are represented by *Cibotium* spp. and ‘ama‘u (*Sadleria* spp.). The documented rare plant of this vegetation community on the SBMR is O‘ahu violet (USARHAW and 25th ID[L] 2001a).

Within the lowland wet communities there are three community types, where conditions are generally warm and sheltered from wind, with annual rainfall exceeding 100 inches (254 centimeters). ‘Ōhi‘a forest is below the Ko‘olau summit between 1,900 and 2,700 feet (823 meters) and below 5,000 feet (1,524 meters) in the Waianae Mountains (USARHAW and 25th ID[L] 2001a). In addition to the dominant tree ‘ōhi‘a, other common tree species include manono, mehame, and kōlea. *Cibotium* species are the dominant ferns. Herbaceous plants are māmaki, naupaka kuahiwi, and na‘ena‘e. Rare plants *Hesperomannia arborescens*, *Doodia hyonii*, *Pteris lidgatei*, *Tetraplasandra gymnocarpa*, *Cyrtandra subumbellata*, and *Isodendrion laurifolium* complete the community in SBMR.

Uluhe shrubland is widespread on many of the Hawaiian Islands, usually in wet lowland areas below 2,200 feet (671 meters). The dominant plants in this community include two ferns, *Dicranopteris linearis* and *Diplopterygium pinnatum*. No rare plants were observed in this community.

Loulu hiwa forest gets between 75 and 150 inches (191 and 381 centimeters) of rainfall annually. It occurs exclusively in the Ko‘olau Mountains on steep, rocky windward slopes. The groves of loulu hiwa (*Pritchardia martii*) are generally homogenous, with little or no understory vegetation. This is considered a globally imperiled vegetation community (USARHAW and 25th ID[L] 2001a).

There are four types of lowland moist communities on the training areas:

- Kāwelu grassland has shallow soils and gets around 30 to 40 inches (76 to 102 centimeters) of rainfall annually. The kāwelu grasses *Eragrostis grandis* and *E. variabilis*, sedges (*Carex wahuensis* and *C. meyenii*), and dwarfed shrubs (*Bidens* spp., *Metrosideros polymorpha*) make up the simple communities, along with rare plants nehe (*Lipochaeta tenuis*) and ‘ānaunau (*Lepidium arbuscula*);

- ‘Ōhi‘a lowland moist shrubland is found on windy slopes commonly adjacent to the Kāwelu grassland, with similar plant species represented. The rare plants in this community are nehe, pāmakani (*Viola chamissoniana*), and pānaunau (*Lobelia yuccoides*);
- O‘ahu diverse forest occupies only about an acre on SBMR. The soil is usually rocky and thin. Common natives are kōpiko (*Psychotria* spp.), mehame, ‘āla‘a (*Pouteria sandwicensis*), and pāpala (*Charpentiera* spp.). The only rare plant documented is *Pteralyxia macrocarpa*. This community is considered critically imperiled; and
- Koa/‘Ōhi‘a forest is below 2,100 feet (640 meters) and in leeward areas of good drainage, where the annual rainfall is between 35 and 75 inches (89 and 191 centimeters). In addition to the dominant trees ‘ōhi‘a and koa (*Acacia koa*), native trees in this community include kōpiko, mehame, ‘ōhi‘a hā, and ‘ahakea (*Bobea* spp.). Uluhe (*Dicranopteris linearis*) is the dominant understory species, and rare plants in this community are nā‘ū (*Gardenia mannii*), kāmakahala (*Labordia gyrtandrae*), *Schiedea pubescens* var. *purpurascens*, and pilo kea (*Platydesma cornuta* var. *decurrens*).

Lowland dry shrubland is generally dominated by ‘a‘ali‘i and is found on the main islands of Hawai‘i. Adjacent communities are often dominated by nonnative grasses and shrublands in fire-disturbed areas like SBMR.

The aquatic natural communities on SBMR are limited to intermittent streams. Though some of these may actually flow all year, agricultural ditches or flumes interrupt them all. The primary drainages for the Main Post are Waikōloa Gulch and Waikele Stream. The north fork and two tributaries (Hale‘au‘au and Mohiākea gulches) of Kaukonahua Stream flow along the northeast boundary of SBMR. All streams on SBMR empty into the Pacific Ocean, except for Waikele Stream, which flows into Pearl Harbor. There are possible marshy, forested, and riparian wetlands on or adjacent to SBMR (USARHAW and 25th ID[L] 2001a). The south fork of Kaukonahua Stream is the only drainage in SBER. The USGS collects streamflow data, but no fish data are available. A stream assessment was conducted for the whole Kaukonahua Stream that documented the endemic species ‘o‘opu nākea (*Awaous guamensis*), ‘o‘opu naniha (*Stenogobius hawaiiensis*), ‘o‘opu hi‘ukole (*Lentipes concolor*), and ‘o‘opu ‘ōkuhe (*Eleotris sandwicensis*) (USARHAW and 25th ID[L] 2001a), but natural resources staff have not confirmed these fish species on SBER.

Disturbed Habitat

The Army seeks to preserve and expand the populations of federally listed plants on lands under its management. The pest management and endangered species management programs overlap and reduce the negative impacts of introduced species on the landscape (USARHAW and 25th ID[L] 2001a). Control of noxious weeds is required by the State of Hawai‘i Noxious Weed Rules (USDA, no date) and is supported by AR 200-5, the Army’s pest management regulations (HQDA 1999).

Noxious weeds and other highly invasive plants targeted for control or eradication around rare plants and communities on SBMR include oriental vessel fern (*Angiopteris evecta*), satinleaf (*Chrysophyllum oliviforme*), ginger (*Hedychium* spp.), and *Juniperus* spp. Current control efforts have focused on strawberry guava (*Psidium cattleianum*), ginger, and Koster’s curse (*Cleidemia*

birta) (USARHAW and 25th ID[L] 2001a). The nonnative plants that occur on SBER and that are targeted for control where they threaten rare or endangered species include moho (*Helicocarpus popayensis*), cat's claw (*Caesalpinia decapetala*), treedaisy (*Montana bibiscifolia*), false meadowbeauty (*Pterolepis glomerata*), Christmas berry, and Sacramento bur (*Triumfetta semitriloba*) (USARHAW and 25th ID[L] 2001a; PCSU 2001).

Populations of feral pigs (*Sus scrofa scrofa*) and goats (*Capra hircus hircus*) directly affect native plants and contribute to numerous ecological problems (Atlas 1998). The effects of these wild pigs and goats include trampled and grazed native plants, erosion, and landslides (USARHAW and 25th ID[L] 2001a; PCSU 1999, 2000, 2001). Water collects in the rutted ground, providing a perfect breeding place for mosquitoes, which can carry avian malaria (HINHP 1994). Browsing and otherwise destroying the native vegetation encourages nonnative plants to become established, which can severely affect the habitat.

The nonnative black twig borer (*Xylosandrus compactus*) is an additional threat to *Gardenia mannii*, *Alectryon macrococcus* var. *macrococcus*, *Flueggea neowawraea*, and possibly *Abutilon sandwicense*, *Melicope lidgatei*, and *Melicope st-johnii* (PCSU 1999). This pest burrows into branches and introduces a pathogenic fungus that often kills the host.

Introduced snails and slugs pose a threat to rare Hawaiian plants by preying on the seedlings' stems and fruit, which reduces regeneration of the host. Rats (*Rattus rattus* and *R. exulans hawaiiensis*) also are known to eat the fruit of native plants, seriously affecting the reproduction of *Pritchardia kaalae* and plants in the *Campanulaceae* and *Gesneriaceae* families (PCSU 2001).

Habitat disturbing activities by humans at SBMR include military training (R. M. Towill Corp. 1997b). Because most native and rare species grow on moderate to steep cliffs, ridges, and gulches, this disturbance is mostly limited to helicopter and foot traffic. Trampling associated with training activities (including construction and maintenance) could affect many of the rare plants (R. M. Towill Corp. 1997b). Pu'u Kalena and Pu'u Hāpapa hiking trails are within SBMR. Hiking activities are monitored to reduce potential human impacts. Littering, making campfires, committing arson, hunting, poaching, and using vehicles are nonmilitary activities that can affect the area (USARHAW and 25th ID[L] 2001a).

Fire occurs in SBMR and is a threat to native plants and ecological communities. Areas along the lower boundary of the native plant zones are mostly highly flammable introduced species. Additionally the rugged terrain of the training area limits access for fire suppression and control. As described in Section 2.1.5, the INRMP and ITAM LCTA programs at SBMR are used to minimize the impacts of training on vegetation through revegetation and fire suppression projects. A wildland fire management plan is being produced for SBMR and SBER and will focus on fire prevention and suppression; it will be finalized by August 2003.

Wildlife

Regular zoological field surveys have covered much of the SBCT ROI. These surveys have focused on special status invertebrates, mammals, and birds. There have been no specific reptile or amphibian surveys at SBMR, due to the absence of native terrestrial reptiles and

amphibians on the Hawaiian Islands. Wildlife surveys were conducted by Shallenberger at SBMR in 1976 and 1977 (USARHAW and 25th ID[L] 2001a; Shallenberger and Vaughn 1978), by the HINHP (1994), and by Pacific Cooperative Studies Unit (PCSU) natural resources staff in 2000 and 2001. These natural resource surveys were used for the resource assessments in the *Endangered Species Management Plan Report, O'ahu Training Areas* (R. M. Towill Corp. 1997b), as well as the more recent *O'ahu Training Areas Natural Resource Management Report* (PCSU 2001) and the *O'ahu Training Areas INRMP* (USARHAW and 25th ID[L] 2001a).

Wildlife information for the SRAA has been gathered from the HINHP database (HINHP 2002) and the Honouliuli Preserve Master Plan (TNC 2000). Less information is available regarding WAAF and the proposed Helemanō Trail. WAAF is an established air field, which offers little refuge to wildlife, particularly native wildlife adapted to Hawai'i's natural habitats. The area proposed for the Helemanō Trail is presently used as agricultural fields and dirt roads. Common O'ahu wildlife would be expected to inhabit these areas. Wildlife information for these two locations was based on the *Draft Environmental Assessment for Realignment of Kunia Gate, Wheeler Army Airfield with the Existing Lyman Gate, Schofield Barracks* (Edward K. Noda and Associates, Inc. 2001), *Preliminary Draft EA Aviation Complex 6A & 6B, FY01-03, Whole Barracks Renewal Wheeler Army Airfield, O'ahu, Hawai'i*. (USACE 2001b), and *Preliminary Draft Schofield Barracks to Helemanō Military Vehicle Trail Land Acquisition Environmental Baseline Study* (USACE 2002b).

The following sections describe the general presence of invertebrate, mammal, bird, and fish species.

Invertebrates

The native invertebrates at the Main Post include the O'ahu tree snail (*Achatinella mustelina*), six achatinellid land snail species (*Acuriculella ambusta*, *A. spp. aff. castanea*, *A. spp. aff. perpusilla*, *Elasmuis spp.*, *Partulina dubia*, and *Tornatellides spp.*), and two amastrid land snail species (*Amastra rubens* and *Letachatina spp.*). Three other native snail species, *Cookeconcha spp.*, *Philonesia spp.*, and *Succinea spp.*, were also observed at the Main Post (R. M. Towill Corp. 1997b; USARHAW and 25th ID[L] 2001a). Endemic invertebrates at SBER include O'ahu tree snails (*Achatinella apexfulva*, *A. byronii*, *A. decipiens*, *A. leucorraphe*, *A. sowerbyana*, and *A. swiftii*). Also found at SBER are achatinellid land snails (*A. perpusilla*, *A. pulchra*, and *A. spp.*), the O'ahu megalagrion damselfly (*Megalagrion oahuensis*), the unique yellow-faced bee (*Hylaeus unica*), and 'opae 'oeha'a, the Hawaiian prawn (*Macrobrachium grandimanus*) (USARHAW and 25th ID[L] 2001a). Additional species currently proposed for federal listing as endangered are two picture-wing flies that occur on SBMR, *Drosophila aglaia* and *D. obatai*. Although the mountainous areas of the Honouliuli Preserve are valuable habitat to many O'ahu land snails, the portion proposed for the SRAA is highly disturbed agricultural area. These areas support mostly nonnative agricultural associated invertebrates (The Nature Conservancy 2000; HINHP 2002).

HHP surveys of SBMR in 1993 detected the following nonnative snails: giant African snail (*Achatina fulica*), bradybaenid land snail (*Bradybaena similaris*), cannibal snail (*Euglandina rosea*), and the zonitid land snail (*Hawaii minuscula*). Humans have purposely or accidentally

introduced these species to O'ahu, and they now threaten the native snail species through competition for resources, predation, and the spread of disease.

Amphibians

There are no native terrestrial amphibians on the Hawaiian Islands. Nonnative amphibians found on O'ahu include the green and black poison dart frog (*Dendrobates auratus*), the bullfrog (*Rana catesbeiana*), wrinkled frog (*R. rugosa*), giant toad (*Bufo marinus*), and Cuban tree frog (*Osteopilus septentrionalis*). These species were introduced into O'ahu from other countries and have the potential to inhabit SBMR, WAAF, and the SRAA.

Reptiles

There are no native terrestrial reptiles on the Hawaiian Islands. Nonnative reptiles that have the potential to inhabit the SBMR, WAAF, and SRAA ROI include the green anole (*Anolis carolinensis*), mourning gecko (*Lepidodactylus lugubris*), stump-toed gecko (*Gehyra mutilata*), tree gecko (*Hemiphyllodactylus typus*), Indo-Pacific gecko (*Hemidactylus garnotii*), house gecko (*H. frenatus*), metallic skink (*Lampropolis delicata*), and gold dust day gecko (*Phelsuma laticauda laticauda*). The only known terrestrial snake occurring on the Hawaiian islands is the island blind snake (*Ramphotyphlops braminus*), although the brown tree snake (*Boiga irregularis*) has been found in Hawai'i at airports and other ports of entry; attempts are being made to prevent this species from establishing itself on the Hawaiian Islands. The red-eared turtle (*Trachemys scripta elegans*) was recorded at Waikele Stream and may be found at SBMR. This species was also identified in Kaukonahua Stream (Ki'ihi Stream), the primary drainage of Poahmoho tributary on KTA and may be found at SBER (USARHAW and 25th ID[L] 2001a).

Terrestrial Mammals

The Hawaiian hoary bat (*Lasionycteris noctivagans*) may occur at all areas of SBMR and SRAA. The last known observation of the hoary bat at SBMR was in 1976 over the Schofield-Waikane Trail (PCSU 2001). It is the only native terrestrial mammal on the Hawaiian Islands (USFWS 1998a).

The following nonnative species may occur at SBMR and SRAA: feral pigs, feral goats, feral cats (*Felis catus*), feral dogs (*Canis familiaris familiaris*), Norway rats (*Rattus norvegicus*), black rats (*R. rattus*), Polynesian rats (*R. exulans hawaiiensis*), and the house mouse (*Mus musculus*).

Birds

The following indigenous species have been recorded at the Main Post: O'ahu 'elepaio (*Chasiempis sandwichensis ibidis*), O'ahu creeper (*Paroreomyza maculatus*), 'i'iwi (*Vestiaria coccinea*), 'apapane (*Himatione sanguinea sanguinea*), O'ahu 'amakihi (*Hemignathus virens chloris*), white-tailed tropicbird (*Phaethon lepturus dorothaei*), black-crowned night heron (*Nycticorax nycticorax hoactli*), Pacific golden-plover (*Pluvialis fulva*), and the Hawaiian short-eared owl (*Asio flammeus sandwichensis*), also known as pueo. The O'ahu 'elepaio, O'ahu creeper, 'i'iwi, O'ahu 'amakihi, and 'apapane are all species limited to the Hawaiian Islands. Native birds recorded at SBER include the O'ahu 'elepaio, O'ahu creeper, 'i'iwi, O'ahu 'amakihi, 'apapane, and O'ahu 'ākepa (*Loxops coccineus wolstenholmi*), the white-tailed tropic bird, black-crowned night heron, and the Pacific golden-plover. Hawaiian short-eared owls are known to inhabit areas adjacent to the

SRAA and may occur on the property (TNC 2000). Mostly nonnative and common birds such as the myna are expected to use the SRAA because of its highly disturbed nature and the agricultural habitat that it provides.

Nonnative bird species known to occur in SBMR include the red-billed leiothrix (*Leiothrix lutea*), white-rumped shama (*Copsychus malabaricus*), Japanese bush warbler (*Cettia diphone*), rock dove (*Columba livia*), spotted dove (*Streptopelia chinensis*), zebra dove (*Geopelia striata*), common myna (*Acridotheres tristis*), red-vented bulbul (*Pycnonotus cafer*), and the Japanese white-eye (*Zosterops japonicus*). The nutmeg manakin (*Lonchura punctulata*), red-crested cardinal (*Paroaria coronata*), barn owl (*Tyto alba*), Erchel's francolin (*Francolinus erckelii*), ring-necked pheasant (*Phasianus colchicus*), house sparrow (*Passer domesticus*), chestnut manakin (*Lonchura malacca*), and northern cardinal (*Cardinalis cardinalis*) are also species that have been introduced by humans on O'ahu and are likely to occur on SBMR. Similar nonnative bird species are expected to occur in the SRAA.

Fish

The following endemic fish are known to inhabit the Waikele Stream, which runs through the Main Post: 'o'opu nākea (*Awaous guamensis*), 'o'opu naniha (*Stenogobius hawaiiensis*), 'o'opu hi'ukole, 'o'opu 'ōkuhe (*Eleotris sandwichensis*), āholehole (*Kuhlia sandvicensis*), and 'ama'ama (*Mugil cephalus*) (USARHAW and 25th ID[L] 2001a). Although these species have not been confirmed on the Main Post, they may occur within that portion of the waterway. No fish data are available specific to Kaukonahua South Fork Stream on SBER (USARHAW and 25th ID[L] 2001a), but information was gathered for Kaukonahua (Ki'iki'i) Stream, which includes the Poamoho tributary on KTA and may represent some species at SBER. Native fish identified from the Kaukonahua Stream assessment include 'o'opu nākea, 'o'opu naniha, 'o'opu 'ōkuhe, and 'o'opu hi'ukole (USARHAW and 25th ID[L] 2001a). Nonnative species known to Waikele Stream on SBMR include the mangrove goby (*Mugilogobius cavifrons*), liberty mollies (*Poecilia spehnrops*), shortfin mollie (*P. mexicana*), bristle-nose (*Anicistrus* spp.), tilapias (*Tilapia melanotheron*, *Tilapia* spp.), Chinese catfish (*Clarias fuscus*), guppies (*Poecilia* spp., *P. reticulatas*), loach (*Misgurnus anguillicaudatus*), mosquito fish (*Gambusia affinis*), *Thiaaira tuberculata*, swordtail (*Xiphorus belleri*), *Lymnea reticulata*, and *Melanoides* spp. The following nonnative species may occur at SBER: swordtail, tilapia, snakehead (*Ophicephalus striatus*), stickfish (*Xenetodon canila*), threadfin shad (*Dorosoma petenense*), midas cichlid (*Amphilophus citrinellum/Cichlasoma labiatum*), oscar, (*Astronotus ocellatus*), jewel cichlid (*Hemichromis elongatus*), bluegill (*Lepomis macrochirus*), *Carassius auratus*, *Ancistrus* spp., *Lophopodella carteri*, *Pterygoplichthys multiradiatus*, and bass (*Micropterus* spp.). The Wilson Lake overflow channel, which Helemanō Trail would cross, is perennial but it is not known if fish inhabit this human-made stream. There is no documented aquatic species information available for the SRAA.

Sensitive Species

Sensitive species include special status, or regulated, species such as federal or state listed endangered, threatened, candidate species, or proposed species, Marine Mammal Protection Act (MMPA) species, federal and state species of special concern, and locally regulated species. Rare species that have had rapid population decline or whose habitat has markedly decreased in recent years are also considered sensitive species. Potential sensitive species at SBMR were identified by HDLNR (2002a), USARHAW biologists, and the HINHP (1994).

A current list of all sensitive plant and wildlife species and any critical habitat found in the SBMR ROI is provided in tables 5-23 and 5-24. The likelihood of a species occurring at SBMR is based on the habitat requirements and geographic distribution of the species, existing on-site habitat quality, and the results of biological surveys. Natural history descriptions of sensitive species with the potential to occur in the ROI, and specific locations if known, can be found in Appendix I-1 (Recovery Plans I-1a; Plants I-1b; Wildlife I-1c; Critical Habitat I-1d).

Sensitive Plant Species

The training areas that make up SBMR are home to 57 rare plant species. The USFWS has also designated critical habitat for areas within the SBMR ROI but there is no designated critical habitat on the Army installations. Documented occurrences of sensitive plant species in the ROI are shown in Figure 5-36 and Table 5-23. Two species within the ROI were not included in the Section 7 consultation. The Army will need to determine the status and location of *Nototrichium humile* and *Lobelia niihauensis* before Section 7 consultation begins again.

Sensitive Wildlife Species

The following discussion includes only those special status wildlife species that are considered likely to be found in the project area. Twenty-eight special status wildlife species are known to occur or have the potential to occur at SBMR or its vicinity (R. M. Towill Corp. 1997b). These include twenty-two rare invertebrates (twenty of which are endangered mollusks), one damselfly and one wasp species, as well as five rare birds and an endangered bat (USARHAW and 25th ID[L] 2001a). Documented occurrences of sensitive wildlife species in the ROI are shown in Figure 5-37. Table 5-24 lists sensitive terrestrial wildlife species and their likelihood of occurrence in the SBMR ROI. Sensitive species occurring within the ROI are most likely to occur in the higher elevations of the Wai'anae and Ko'olau Mountains and are unlikely to occur in the disturbed lowland areas, which make up a large portion of the ROI. There is one wildlife species with a recovery plan in the ROI (Appendix I-1).

Sensitive Habitats

Critical Habitat

Army lands were excluded from the 2003 plant critical habitat designations for O'ahu based on the essential contribution that Army-led natural resource conservation actions play in the stabilization of threatened and endangered species. Small portions of critical habitat may occur within the ROI but outside of installation boundaries. The USFWS has designated critical habitat within the SBMR ROI: 180 acres for 12 plants and 4,620 acres for O'ahu 'elepaio. Plants with critical habitat within the ROI are listed in Appendix I-1d and are shown in Figure 5-34. Critical habitat for designated plants is shown in Figure 5-38 and critical habitat for O'ahu 'elepaio is shown in Figure 5-39.

Table 5-23
Sensitive Plant Species Occurring or Potentially Occurring in the SBMR/WAAF ROI

Scientific Name	Hawaiian Name/ Common Name	Federal ¹ Status	State ² /Global ³ Status	Habitat	Date Last Observed	Likelihood of Occurrence
<i>Abutilon sandwicense</i>	NCN	E, CH	-/G1	Dry to moist lowland forest	2003	C
<i>Alectryon macrococcus</i> var. <i>macrococcus</i>	'ala 'alahua, māhoe/-	E, CH	-/G2	Moist forest and gulch slopes in native dominated forest	2000	C
<i>Alsinidendron trinerve</i>	NCN	E, CH	-/G1	Wet forest slopes	2003	C
<i>Boea sandwicensis</i>	'ahakea/-	<u>SOC</u>	-/G1	Moist to wet forests	2002	C
<i>Chamaesyce rockii</i>	'akoko, koko, kōkōmālei/-	E, CH	-/G1	Wet 'ōhi'a-uluhe forests on upper ridges	1993	C
<i>Cyanea acuminata</i>	Hāhā/-	E, CH	-/G1	Moist to wet forests	2001	C
<i>C. grimesiana</i> spp. <i>obatae</i>	Hāhā/-	E, CH	-/G2	Moist to wet forests	1992	C
<i>C. koolauensis</i>	Hāhā/-	E, CH	-/G1	Moist to wet forest	2000	C
<i>C. lanceolata</i> ssp. <i>calgyria</i>	Hāhā/-	C	-/G1	<u>Moist to wet forest</u>	1999	C
<i>C. membranacea</i>	Hāhā/-	<u>SOC</u>	-/G2	<u>Moist to wet forest</u>	1992	C
<i>Cyrtandra subumbellata</i>	Ha'iwale/-	E, CH	-/-	Moist to wet forests	2000	C
<i>Delissea subcordata</i>	NCN	E, CH	-/G1	Moist forest	2000	C
<i>Diellia falcata</i>	Palapalai lau li'i/-	E, CH	-/G1	Dry forests in deep shade or open understory	2000	C
<i>Dissochondrus biflorus</i>	-/NCN	SOC	-/G2	Diverse moist forest slopes	1994	C
<i>Doodia lyoni</i>	-/NCN	SOC	-/G1	<u>Dark moist forests and near streambanks</u>	1993	C
<i>Dubautia sherffiana</i>	Na'ena'e/-	SOC	-/G1	Dry coastal and wetter inland ridge tops	2000	C
<i>Exocarpos gaudichaudii</i>	Heau/whisk broom sandalwood	SOC	-/G1	Moist ridges and shrubland, often associated with 'ōhi'a	2000	C
<i>Flueggea neowawraea</i>	Mehamehame/-	E, CH	-/-	Moist forests and gulch slopes	2000	C
<i>Gardenia manii</i>	Nānū, nā'ū/-	E, CH	-/G1	Moist to wet forests dominated by 'ōhi'a	1992	C
<i>Hesperomeinnia arborescens</i>	NCN	E, CH	-/-	Slopes and ridges in wet forest	2000	C
<i>Isodendrion longifolium</i>	aupaka/-	T, CH	-/-	Diverse moist forest on rocky slopes	2000	C
<i>Joinvillea ascendens</i> ssp. <i>ascendens</i>	Ohe/-	C	-/G5	<u>Wet forests and along streams</u>	1999	C
<i>Labordia cyrtandrae</i>	kāmakahala/-	E, CH	-/G1	Moist valleys and forests	2000	C
<i>L. kaalae</i>	kāmakahala/-	SOC	-/G1	On ridges in diverse moist forest	2001	C
<i>Lepidium arbuscula</i>	ʻānaunau, naunau, kūnānā/-	E, CH	-/G1	Commonly found on exposed ridges and cliffs	2000	C
<i>L. tenuis</i>	nehe/-	SOC	-/G2	Found only in the central Wai'anae Mountains in diverse moist forest	2001	C
<i>Lobelia gaudichaudii</i> var. <i>koolauensis</i>	NCN	E	-/-	Wet cloud-swept slopes	2000	C
<i>L. nūnahensis</i>	pānaunau/-	E, CH	-/G2	Wet windswept summits	2001	P
<i>L. hypoleuca</i>	pānaunau/-	<u>SOC</u>	-/G3	Dry ridges and canyons in diverse moist forest	2001	C
<i>L. yuccoides</i>	pānaunau/-	<u>SOC</u>	-/-	<u>Dry ridges and canyons in diverse moist forest</u>	1995	C

Table 5-23
Sensitive Plant Species Occurring or Potentially Occurring at SBMR/WAAF ROI (continued)

Scientific Name	Hawaiian Name/ Common Name	Federal ¹ Status	State ² /Global ³ Status	Habitat	Date last Observed	Likelihood of Occurrence
<i>Melicope christophersonii</i>	'alani/-	C	-/-	Wet forest	1997	C
<i>M. cinerea</i>	'alani/-	SOC	-/G1	Native dominated moist forests	2000	C
<i>M. sandwicensis</i>	'alani/-	SOC	-/-	Diverse moist forests	1993	C
<i>Neriodia melastomatifolia</i>	ma'aloa/-	SOC	-/ G2	Diverse moist forests	2000	C
<i>Nototrichium humile</i>	Kului / NCN	E, CH	-/G2	Remnant dry forest and cliff faces	To Be Determined	P
<i>Panicum beechyi</i>	NCN	-	-/G2	Mesic ridges and gulch bottoms	2002	C
<i>Phlegmariurus nutans</i> (<i>Lycopodium nutans</i>)	wāwae'iole/-	E, CH	-/-	Wet forest	2000	C
<i>Phyllostegia hirsuta</i>	ulihi/-	E, CH	-/G1	Steep shaded slopes in wet to moist forests	2001	C
<i>P. kaalaensis</i>	ulihi/-	E, CH	-/G1	Steep shaded slopes in wet to moist forests	2001	C
<i>P. mollis</i>	ulihi/-	E, CH	-/G1	Steep shaded slopes in wet to moist forests	2000	C
<i>Plantago princeps</i> var. <i>princeps</i>	'ale, laukahi	E, CH	-/-	Moist cliffs and rainforests	2000	C
<i>Platydesma cornuta</i> var. <i>cornuta</i>	kuahiwi/- pilo kea/-	C	-/G2	Moist forest	2000	C
<i>Platydesma cornuta</i> var. <i>decurvens</i>	pilo kea/-	C		Moist forest	1999	C
<i>Pleomele forbesii</i>	halapepe/-	C	-/G1	Dry and moist forests	2000	C
<i>Pteralyxia macrocarpa</i>	kaulu/-	C	-/G2	Valleys and slopes of diverse moist forest	2000	C
<i>Pteris ludgatei</i>	waikamanui/-	E, CH	-/G1	Lowland wet forests	2000	C
<i>Sanicula purpurea</i>	NCN	E, CH	-/G1	Moist forests in deep soil	2001	C
<i>Schiedea hookeri</i>	ma'oli'oli/-	E, CH	-/G1	Diverse moist forest	2000	C
<i>S. liguistrina</i>	ma'oli'oli/-	SOC	-/G2	Diverse moist forest	1992	C
<i>S. pentandra</i>	ma'oli'oli/-	SOC	-/G2	Diverse moist forest	1994	C
<i>Sicyos lanceoloides</i>	'anunu/-	SOC	-/G1	On ridges or spurs in moist forest	2000	C
<i>Strongylodon ruber</i>	NCN	SOC	-/G1	Mid-elevation wet forest	2001	C
<i>Tetraplasandra gymnocarpa</i>	'ohe'ohe/-	E, CH	-/G1	Wet to moist summit forests	2000	C
<i>Viola chamissoniana</i> spp.	'olopū, Pāmakani/- <i>chamissoniana</i>	E, CH	-/G3	Moist, somewhat exposed cliff habitat	2000	C
<i>V. oahuensis</i>	NCN	E, CH	-/-	Wet forests on cloud-swept summits	2001	C

Sources: USFWS 2002a; USARHAW and 25th ID[L] 2001a; PCSU 2001

Notes:

NCN = No common name

Status:

¹Federal:
E = Endangered occurrences)

SOC = Species of concern

C = Candidate species for listing

CH = Critical habitat designated or proposed for designation

²State

/ - = No Status

³Heritage Global Rank:

G1 = Species critically imperiled globally (typically 1-5 current

G2 = Species imperiled globally (typically 6-10 current occurrences)

G3 = Species very rare with restricted range

Likelihood of occurrence on the project site

C = Confirmed

P = Potentially may occur

U = Unlikely to occur

